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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,547	04/14/2004	Tae-yong Kwon	1572.1257	4395

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EXAMINER

CROWELL, ANNA M

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 12/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/823,547

Applicant(s)

KWON ET AL.

Examiner

Michelle Crowell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 October 2004.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.  
4a) Of the above claim(s) 2-4 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1 and 5-17 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 04-14-04.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election with traverse of Species I, claims 1 and 5-17 in the reply filed on October 22, 2004 is acknowledged. The traversal is on the ground(s) that the group of claims are in the same field of technology and do not provide undue burden to the examiner. This is not found persuasive because the groups are patentably distinct and require a different search.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 2-4 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim.

### *Priority*

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Drawings*

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the **coil in claim 15 and the cooling pipe in claim 13** must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet,

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even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear to the Examiner of the purpose of using both the metal plate and the coil in or as the electrode. Additionally, the function of the coil is unclear. For purposes of examination, the grounded electrode includes the metal plate as seen in Figure 3.

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7. Claim 15 recites the limitation "the **grounded** upper or lower electrode" in lines 1 and 2.

There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1 and 5-12, 14, and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Itoh (U.S. 5,820,947).

Referring to Figure 1 and column 3, line 36-57, a plasma processing apparatus comprising: an upper electrode 11, a lower electrode 12 corresponding to the upper electrode, to place a substrate 13 on; and a high frequency power generator 14 to generate plasma by applying high frequency power to the upper electrode or the lower electrode, wherein a distance between the upper electrode and the lower electrode varies discontinuously on a portion of opposite surfaces of the electrodes by varying the shape of the upper electrode.

With respect to claim 5, the plasma processing apparatus further includes the upper electrode is formed with a plurality of protrusions and depressions (Fig. 1 and col. 3, 48-52).

With respect to claim 6, the plasma processing apparatus further includes the protrusions and depressions are symmetric about a point in the center of the upper electrode (Fig. 1).

With respect to claim 7, the plasma processing apparatus further includes the protrusions and depressions are small enough so as to not affect distribution of gas used in an etching process (Fig. 1).

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With respect to claim 8, the plasma processing apparatus further includes the upper electrode, having the protrusions and the depressions, and corresponding to the lower electrode, is preferably parallel to the lower electrode (Fig. 1 and col. 3, lines 36-41).

With respect to claim 9, the plasma processing apparatus further includes a gas supplier 16 to supply gas reacting to the plasma (col. 3, lines 41-43).

With respect to claim 10, the plasma processing apparatus further includes a vacuum pump 17 to discharge the gas (col. 3, lines 43-47).

With respect to claim 11, the plasma processing apparatus further includes a vacuum chamber 15, in which the vacuum pump 17 causes a vacuum state by discharging the gas (col. 3, lines 41-47).

With respect to claim 12, the plasma processing apparatus further includes the upper electrode 11, the lower electrode 12, and the substrate 13 are provided inside the vacuum chamber 15 (Fig. 1 and col. 3, lines 36-41).

With respect to claim 14, the plasma processing apparatus further includes the lower electrode 12 that is not connected to the high frequency generator is grounded (Fig. 1 and col. 3, line 38).

With respect to claim 16, the plasma processing apparatus comprising: an upper electrode 11, a lower electrode 12 corresponding to the upper electrode, to place a substrate 13 on; and a high frequency generator 14 to generate plasma by applying high frequency power to the upper electrode or the lower electrode, wherein a processing rate is adjusted to be uniform for all parts of an processed substrate by varying a distance between the upper and the lower

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electrode to compensate the density of the plasma with an RF electromagnetic field applied to the upper electrode (col. 3, lines 36-52, col. 6, lines 13-18).

With respect to claim 16, the plasma processing apparatus comprising: an upper electrode 11, and a lower electrode 12, wherein an RF electromagnetic field applied to the apparatus is controlled to improve a processing uniformity by making the distance between the upper electrode and the lower electrode discontinuous between opposite surfaces (col. 3, lines 36-52, col. 6, lines 13-18).

10. Additionally, with respect to the above limitations reciting an etching process, it should be noted that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). The apparatus of Itoh is capable of performing the claimed etching apparatus.

### ***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

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claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh (U.S. 5,820,947) in view of Kim et al. (U.S. 5,990,016).

The teachings of Itoh have been discussed above,

Itoh fails to teach a cooling pipe in the lower electrode.

Referring to Figure 4 and column 2, lines 15-23, Kim et al. teaches a plasma processing apparatus comprising a cooling pipe 14 and 15 provided in the lower electrode, to control a temperature of the substrate 13 and the lower electrode 12. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the lower electrode of Itoh with a cooling pipe as taught by Kim et al. since this would to control a temperature of the substrate and the lower electrode.

Itoh fails to teach a grounded electrode comprising a metal plate.

Referring to column 2, lines 23-25, Kim et al. teaches that it is conventionally known in the art for a grounded upper or lower electrode to comprise a metal plate. Thus, it would have been obvious to one of ordinary skill in the art for the grounded electrode of Itoh to comprise a metal plate as taught by Kim et al. since it is conventionally known in the art to use a metal plate as a grounded electrode and a conductive material, such as a metal plate, is typically used to manufacture a grounded electrode.



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***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Zajac '901, Cain et al. '524, Mundt et al. '162, Igarashi et al. '571, and Matsuki et al. '692 show an electrode surface varying in shape.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (9:00 - 5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMC

12-17-04 *AMC*

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